

viewpoint

PUBLIC POLICY FOR THE PRIVATE SECTOR

Feed-In Tariffs or Auctions?

Procuring Renewable Energy Supply in South Africa

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Feed-in tariffs have been the most widely used support mechanism to encourage the growth of grid-connected renewable energy. But could competitive tenders or auctions offer lower prices while still providing adequate incentives for market entry by renewable energy suppliers? This Note looks at recent developments in South Africa, which initially explored feed-in tariffs for renewable energy but then turned instead to competitive tenders. Initial outcomes are encouraging: there has been much market interest, and subsequent bidding rounds have seen prices fall. Could there be lessons for other countries?

South Africa relies more on coal for electricity production than any other country. But in the face of climate change concerns it has embarked on a transition to lower-carbon-emitting technologies. Its most recent electricity plan included, for the first time, ambitious targets for renewable energy: 18,800 megawatts of wind and solar, out of a total projected system capacity of around 90,000 megawatts, by 2030. To expand renewable energy supply, South Africa first explored the option of renewable energy feed-in tariffs (REFITs) before choosing instead to pursue competitive tenders. Its experience may offer lessons for other developing and emerging market economies.

The birth and death of the REFIT program

The National Energy Regulator of South Africa (NERSA) approved a REFIT policy in 2009.

Tariffs were designed to cover generation costs plus a real return on equity of 17 percent and would be fully indexed for inflation (NERSA 2009). Initial published feed-in tariffs—15.6 cents per kilowatt-hour for wind, 26 cents per kilowatt-hour for concentrated solar (troughs, with 6 hours' storage), and 49 cents per kilowatt-hour for photovoltaics—were generally regarded as generous by developers.¹ But considerable uncertainty remained, including the legality of feed-in tariffs within South Africa's public procurement framework and delays in finalizing power purchase agreements and interconnection agreements with the national utility, Eskom.

In March 2011 NERSA unexpectedly released a consultation paper with lower feed-in tariffs, arguing that a number of parameters—such as exchange rates and the cost of debt—had changed. The new tariffs were 25 percent lower



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for wind, 13 percent lower for concentrated solar, and 41 percent lower for photovoltaics (in nominal rand terms). Moreover, the capital component of the tariffs would no longer be fully indexed for inflation. Importantly, in its revised financial assumptions NERSA did not change the required real return for equity investors of 17 percent (NERSA 2011).

More policy and regulatory uncertainty was to come. After receiving legal advice that feed-in tariffs were inconsistent with public finance and procurement laws, the Department of Energy announced that a competitive bidding process for renewable energy would be launched, known as the Renewable Energy Independent Power Producer Procurement (REIPPP) program. Subsequently, the regulator abandoned feed-in tariffs: not a single megawatt of power had been signed in the two years since the launch of the REFIT program (although it is probably fair to admit that a practical procurement process was never implemented). These developments were met with dismay by many renewable energy project developers that had secured sites and had initiated resource measurements and environmental impact assessments. But it was these early developers that were later ready to benefit from the first round of competitive bidding.

The birth and early life of the REIPPP program

The Department of Energy, with the assistance of the National Treasury's Public-Private Partnership Unit and a phalanx of international transaction advisers, commenced work on bid documents. A request for qualification and proposals was issued in August 2011. A compulsory bidders' conference was held in September of that year and attracted more than a thousand participants, many from abroad. A total of 3,625 megawatts of new power capacity was offered, with overall procurement caps for specified technologies, mainly wind and photovoltaics, but also smaller amounts available for concentrated solar, biomass, biogas, landfill gas, and small hydro (see table 2 below).

The tenders for different technologies were held simultaneously. Bidders could bid for more than one project and also for different technologies. Projects had to be larger than 1 megawatt,

and an upper limit was set for different technologies—for example, 50 megawatts for concentrated solar and 140 megawatts for a wind project. Another 100 megawatts was reserved for small projects below 5 megawatts. Price caps were specified for each of these technologies at levels not dissimilar to NERSA's 2009 REFITs, all of them much higher than Eskom's average generation tariff of around 5 cents per kilowatt-hour at the time. Standard 20-year, local-currency-denominated power purchase agreements were offered for the different technologies, with the off-taker being Eskom. Up to five discrete bidding rounds were envisaged, at more or less six-month intervals, with the first round of bids due in November 2011.

Qualification criteria

The bid evaluation involved a two-step process. In the first, bidders had to satisfy certain minimum threshold requirements in six areas: environment, land, commercial and legal, economic development, financial, and technical. For example, wind developers were required to provide 12 months of wind data for the designated site and an independently verified generation forecast. Project developers were responsible for identifying appropriate sites and for paying for measurement and early development costs at their own risk. Wind turbines had to be certified for compliance with the international technical standard IEC 61400-1.

The economic development requirements in particular were complex, incorporating 17 sets of minimum thresholds and targets (table 1). For wind projects, for example, at least 12 percent of the project company shares had to be held by black South Africans and another 3 percent by local communities. At least 1 percent of project revenues had to go to socioeconomic contributions. The minimum threshold for local content was set at 25 percent, with a target of 45 percent being encouraged.

Bid bonds or guarantees had to be posted, equivalent to US\$12,500 per megawatt of nameplate capacity of the proposed facilities, and the amount was doubled once preferred bidder status had been announced.

Bidders that satisfied the threshold requirements then proceeded to the second step of

Table Economic development thresholds and targets for wind projects in South Africa's REIPPP program

Factor and criteria	Threshold (%)	Target (%)
Job creation		
South Africa-based employees who are citizens	50	80
South Africa-based employees who are black citizens	30	50
Skilled employees who are black citizens	18	30
South Africa-based employees who are citizens from local communities	12	20
Local content		
Value of local content spending	25	45
Ownership		
Shareholding by black people in the project company	12	30
Shareholding by black people in the contractor responsible for construction	8	20
Shareholding by black people in the operations contractor	8	20
Shareholding by local communities in the project company	3	5
Management control		
Black top management	n.a.	40
Preferential procurement		
Broad-based black economic empowerment (BBBEE) procurement spending	n.a.	60
Procurement from small enterprises	n.a.	10
Procurement from women-owned vendors	n.a.	5
Enterprise development		
Enterprise development contributions	n.a.	0.6
Adjusted enterprise development contributions	n.a.	0.6
Socioeconomic development		
Socioeconomic development contributions	1.0	1.5
Adjusted socioeconomic development contributions	1.0	1.5

Note: n.a. = not applicable (no threshold set).

Source: South African Department of Energy, REIPPP program bid documents and press releases (<http://www.ipp-renewables.co.za>).

evaluation, where bid prices counted 70 percent with the remaining 30 percent weighting given to composite scores on job creation, local content, preferential procurement, enterprise development, and socioeconomic development. Bidders were asked to provide two prices: one fully indexed for inflation and the other partially indexed, with the bidder allowed to determine the proportion that would be indexed.

Round one outcomes

A total of 53 bids were received initially, amounting to 2,128 megawatts. A large legal, technical, financial, and governance evaluation team was assembled in a high-security environment with 24-hour voice and CCTV monitoring. The team included local legal firms (Bowman Gilfillan, Edward Nathan Sonnenberg, Ledwaba Mazwai, Webber Wentzel, and BKS) as well as international firms (Linklaters for legal, Mott Macdonald for technical, and Ernst & Young and PwC for the financial and governance

reviews). The evaluation resulted in 28 qualifying bids, amounting to 1,416 megawatts of new capacity (table 2). For the first round, a deadline of July 2012 was set for financial close (the date was later extended), and a deadline of the end of 2014 for the commercial operating date.

Although bidders could not know for certain the total capacity that would be bid, they probably assumed that the tight deadlines and challenging threshold qualification criteria would result in less capacity being bid than was made available in round one. Accordingly, the prices bid were mostly uncompetitive and only marginally below the caps specified in the request for proposals. Implementation, direct, and power purchase agreements were signed in November 2012 between the government, Eskom, and each of the 28 successful bidders, resulting in a total investment of close to US\$6 billion. Much of the debt component was provided by local South African commercial banks.

Table

Renewable energy capacity made available for bids and allocated to preferred bidders in South Africa's REIPPP program (megawatts)

Technology	Available in round 1	Allocated in round 1	Available in round 2	Allocated in round 2	Remaining in round 3
Wind	1,850	634	650	562.5	653.5
Photovoltaics	1,450	631.5	450	417.1	401.4
Concentrated solar	200	150	50	50.0	0
Small hydro	75	0	75	14.3	60.7
Landfill gas	25	0	25	0	25
Biomass	12.5	0	12.5	0	12.5
Biogas	12.5	0	12.5	0	12.5
Total	3,625	1,415.5	1,275.0	1,043.9	1,165.6

Source: South African Department of Energy, REIPPP program bid documents and press releases (<http://www.ipp-renewables.co.za>).

Round two outcomes

The design of the second bidding round incorporated lessons from the first, with less capacity (1,275 megawatts) being offered in order to stimulate more competition. The second round closed in March 2012. This round brought 79 bids, totaling 3,255 megawatts. Of these bids, 51 met the qualifying criteria, and 19 of them were granted preferred bidder status (doing so for the next-best bids would have resulted in more than the full window being allocated). Wind and photovoltaics prices in the second round were much more competitive, falling on average by 20 percent for wind and 40 percent for photovoltaics (table 3). The range of prices bid was also wider, with prices varying from 10 to 12 cents per kilowatt-hour for wind and from 17.5 to 22 cents per kilowatt-hour for photovoltaics. The price for concentrated solar fell by 7 percent, with one preferred bidder taking up the remaining available capacity. There was little competition in small hydro, with only two qualifying bids, both at the capped price.

The round two preferred bidders also offered better local content terms, with average local content for photovoltaics rising from 28.5 percent to 47.5 percent, for wind from 21.7 percent to 36.7 percent, and for concentrated solar from 21 percent to 36.5 percent. The deadline for financial close for round two was extended from the end of 2012 to May 2013.

The remaining 1,166 megawatts are being made available in the third bidding round, which will close in August 2013.

While prices have fallen in South Africa, they are not necessarily as attractive as those achieved in other countries. For example, Maurer (2012) reports that in Brazil average auction prices for

wind power fell from 9.8 cents per kilowatt-hour in 2009 to 8.5 cents in 2010 to 6 cents in 2011. The same source cites 6.9 cents per kilowatt-hour for wind and 12 cents per kilowatt-hour for photovoltaics in Peru. South African prices might be higher because of local content and economic development criteria. In addition, interviews suggest that the initial bidding round involved high transaction costs in terms of advisers and financing. These costs fell in round two (along with equipment prices) and are likely to fall further in subsequent rounds.

What are the lessons?

The South African REIPPP program is not only the largest renewable energy program in Africa; it is also the largest IPP program of any African country and probably the most complex public-private procurement ever run on the continent. According to Bloomberg New Energy Finance, South Africa ranked among the top 10 countries on clean energy investment in 2012, ahead of Canada, Brazil, Spain, and France. This is all the more remarkable given South Africa's previously dismal record in IPPs and the dominance of its national utility. Eskom, on the government's instruction, had attempted to run a number of IPP procurements before, all of which failed. Ultimately, the Department of Energy and the National Treasury had to wrest control of the REIPPP program from Eskom.

Although projects still have to achieve commercial operation, the South African REIPPP program can be considered a success in terms of attracting a multitude of private project developers and investors. In its second round the program has also fostered competition with

Renewable energy prices in South Africa's REFIT and REIPPP programs (South African rand per kilowatt-hour)

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Technology	REFIT program			REIPPP program	
	2009 tariff	2011 tariff	Bid cap	Round 1 average bid	Round 2 average bid ^a
Wind	1.25	0.94	1.15	1.14	0.90 (11)
Photovoltaics	3.94	2.31	2.85	2.76	1.65 (21)
Concentrated solar	2.10	1.84	—	2.69	2.51 (31)
Small hydro	0.94	0.67	1.03	—	1.03 (13)

Note: Prices assume full inflation indexing over a 20-year contract. — = not available.

a. Numbers in parentheses are prices in U.S. cents.

Source: South African Department of Energy, REIPPP program bid documents and press releases (<http://www.ipp-renewables.co.za>).

consequent, and impressive, falls in prices, which would in all likelihood not have happened in a REFIT program. And it has achieved results in record time: bidding in the first round closed three months after the request for proposals was issued, preferred bidders were announced within a month, and contract signing and financial close were achieved 10 months later, even though as many as 28 projects, employing different technologies of different sizes at different sites, had to be processed in parallel.

Factors in the REIPPP program's success

Several elements have contributed to the success of the REIPPP program.

- The procurement process was well designed. Recognizing that there was little institutional capacity to run a sophisticated, multiproject, multibillion-dollar international competitive bidding process for renewable energy, South Africa's Department of Energy sought the assistance of the National Treasury's Public-Private Partnership Unit, which in turn relied extensively on local and international transaction advisers.
 - High standards were set for the bidding process, and apart from necessary clarifications, the government stuck to the announced schedule and core bid requirements (although the deadline for financial close slipped a few months as the government finalized financial security arrangements). Despite a tight time schedule and tough qualification criteria, the REIPPP program attracted 53 bids in round one and 79 in round two. A large number of these met the minimum qualification thresholds: 28 in round one and 51 in round two.
- However, the announcement of the REFIT program two years before the launch of the REIPPP program contributed to early market interest, and a number of bidders had already identified sites and begun resource measurements. Before issuing the request for proposals, the Department of Energy had also issued an earlier request for information from prospective project developers, which confirmed significant market readiness.
- Flexibility in the design of subsequent bidding rounds meant that lessons could be incorporated to improve the competitiveness of bids and prices. For example, it became apparent that the capacity made available in round one exceeded the capacity of the market to deliver, and the capacity tendered in round two was reduced to induce more competition.
 - The renewable energy sector is potentially highly competitive, given the diversity of energy sources, the modular nature of most of the technologies, and the number of project developers. When South Africa ran its first competitive tender for IPPs—two large gas turbine peaking plants—it received only two bids, one of which was later withdrawn. It is perhaps no accident that the first successful international competitive tender for power in South Africa has been in renewable energy.
 - Subsequent bidding rounds have incorporated more stringent threshold as well as target criteria for local content objectives, which will result in employment creation.
 - The local capital market has responded positively to the opportunity presented by the REIPPP program, which will involve total investment approaching US\$15 billion in

its 3,725 megawatts of renewable energy. Commercial banks have been willing to finance construction, and some are on-selling debt to insurance companies. Given competing demands in other infrastructure sectors in South Africa, however, funding further REIPPP programs would stretch local banks, and other sources of funding, such as pension funds, will need to be mobilized.

- Real returns to equity in round one were close to the 17 percent (in local currency) that was envisaged in determining the original feed-in tariffs. Equity returns dipped slightly in round two for wind and probably more substantially for photovoltaics. Dollar returns in the range of 12–13 percent have been reported.
- Project bidders are required to incorporate a tax of 1 percent of project revenues that will go into a government renewable energy fund to support subsequent procurement programs.
- All the successful bidders in round one have reached financial close and have begun construction. It remains to be seen what proportion of preferred bidders in round two will achieve financial close. The aim of the REIPPP program is lower prices, but projects must still be bankable. A successful bidding process should have a low attrition rate among preferred bidders. Bid prices need to be realistic.
- Specifications on what constitutes local content could be improved, including more focus on those parts of the value chain that maximize local employment.
- A balance needs to be struck between the promotion of economic development and prices. Economic development threshold and target criteria are more stringent than in most other countries (and, indeed, more stringent than in previous public-private partnerships in South Africa). The South African renewable energy market is small by international standards, and investment in local manufacturing capability is not necessarily competitive. International benchmarks indicate that South African renewable energy prices are high.

Potential areas for improvement

While much has gone well in the REIPPP program, hindsight suggests that some areas could have been better designed and managed.

- The size and readiness of the local renewable energy market were initially overestimated, resulting in less capacity being bid than was made available. There was thus limited competition in round one, and bid prices were close to the price cap. Use of the single-price offer (rather than a dynamic reverse auction as employed, for example, in Brazil) also restricted competition.
- The size and complexity of the REIPPP program stretched available legal and financial advisory services to the limit. Some firms were permitted to offer advisory services to both the government and private bidders and funders as long as they created adequate “Chinese walls” within the firm. Some bidders complained that legal and financial firms were offering a “one size fits all” service, which was not always appropriate for specific projects.
- The above two points suggest that it might have been more prudent to start smaller and then gradually ramp up the program, with larger blocks of capacity being offered in subsequent rounds.
- In some areas there is inadequate transmission grid capacity and otherwise viable and attractive projects have to compete for access. There have also been complaints about the lack of responsiveness of Eskom transmission planners. Integration of planning, procurement, and contracting functions in the proposed independent transmission, system, and market operator would make it easier to resolve these constraints.
- The transaction costs for the REIPPP program were high for both the government and the bidders (certainly higher than for a REFIT program). The government has had to rely on external transaction advisers. But there is potential to transfer skills and experience in future procurement rounds and to build capacity in the proposed independent system and market operator.
- The levelized energy costs that were calculated for the initial feed-in tariffs served as the departure point for the REIPPP program. Some other countries, such as Tanzania, have used avoided costs as their starting point.
- In October 2012 the minister of energy announced that another 3,200 megawatts of

renewable energy projects would be tendered, with a target for the commercial operating date between 2017 and 2020. South Africa's power market continues to be shaped by centrally managed power planning and procurement processes. However, there are growing political and stakeholder concerns around rising electricity prices. And demand growth is lower than predicted. The sustainability of the REIPPP program depends on volumes and predictable procurement processes. But its sustainability will depend also on how quickly renewable energy prices fall and how competitive they become with prices for other energy sources.

Conclusion

South Africa's REIPPP program provides a valuable opportunity in learning how to procure renewable energy projects effectively in developing countries. What are the lessons for other developing and emerging market economies?

The South African experience suggests that competitive tenders are a viable alternative to feed-in tariff programs for renewable energy and potentially offer better price outcomes with fewer risks of excessive rents being appropriated by renewable energy suppliers. In developed countries the core rationale for introducing REFITs was to create market certainty and simplify procurement processes in order to stimulate production and innovation in climate-change-mitigating renewable energy technologies and markets, thus bringing prices down over time. But in many developing countries, especially in Africa, the market for renewable energy technologies is much smaller and this rationale does not apply. Indeed, for many smaller developing countries with low carbon footprints, the argument for greater use of more expensive renewable energy technologies needs to be balanced against other development priorities.

While competitive tenders for renewable energy are potentially an attractive alternative to REFITs, transaction costs are high and many small developing countries may lack the capacity or resources to run such complex and expensive procurement processes. REFIT programs are generally simpler, although the requirements for

good design and evaluation should not be underestimated. Development assistance programs, including those from development finance institutions, should carefully consider the costs and benefits of competitive tenders relative to those of feed-in tariff regimes. Funding the higher initial transaction costs will ultimately be more cost-effective if lower power prices are likely.

These lessons also apply in the main to auctions for renewable energy. Competitive tenders generally incorporate a weighting of price and nonprice factors while auctions are awarded solely on the basis of lowest price (sometimes after a number of rounds) among qualified bidders. Running effective auctions might require even greater time, expenditure, transaction costs, expertise, and capabilities than running tenders. Auctions might also encourage underbidding, with the risk of subsequent contract failures. But the experience with dynamic reverse auctions—for example, for wind energy in Brazil—has been positive: competition has driven prices down dramatically. It would be interesting to explore the possibility of a hybrid design in which winning prices from a dynamic reverse auction are subsequently weighted with nonprice factors.

Notes

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1. Unless otherwise specified, values in cents are in U.S. cents. Rand values have been converted using an exchange rate of 8 rand per U.S. dollar.

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